

## REMARKS

Applicant has carefully considered the Office Action of November 27, 2001. The present response is intended to be fully responsive to all points of objection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application are respectfully requested.

The specification has been amended on pages 2, 4 to provide proper antecedent basis for the claimed subject matter, as recited in claim 1, specifically, the words "a predetermined element" have been replaced by the words "the coupling apparatus". As may be clearly seen in Fig.1, the piston apparatus is connected at one end to the stationary support, and connected at another end to the coupling apparatus, which moves in response to movement of the buoyancy apparatus.

The specification has been amended on pages 3, 4 to provide proper antecedent basis for the claimed subject matter, as recited in claim 1. Specifically, the text has been amended to read: "wherein the hydraulic fluid is transported via pumping action through the piping system to operate the hydraulic motor, the pumping action taking place during both contraction and expansion of the piston apparatus."

Support for this amendment is found at page 8, lines 18-23, as indicated further herein.

Claims 1 and 5 have been amended to remove Sec. 112 rejections, to clarify terms where necessary, and to provide antecedent basis where required.

Regarding the Examiner's Sec. 112 rejection of claim 7 on the grounds that it is not supported by specification and drawings, and that "said pressure tank" lacks antecedent basis, the Examiner's attention is directed to the specification at page 8, lines 18-23, in

which the conduit system and the pressure tank are defined in detail:

"In accordance with a preferred embodiment of the invention, piping system 57 comprise a first conduit 61 for leading hydraulic fluid into pressure tank 59 when piston means 49 is contracted, and a second conduit 63 for leading hydraulic fluid into pressure tank 59 when piston means 49 is extended."

In addition, the Examiner's attention is directed to Fig. 1, in which conduits 61, 63 emanating from piston 49, and leading hydraulic fluid via one-way valves 69, 71 to pressure tank 59 are clearly marked. Therefore, the claim language is well-supported both by the specification and by the drawing.

In addition, claim 1 has been amended to clarify the pumping action through the piping system. Support for this amendment is provided in the specification as described above.

The Examiner has rejected claims 1-5 under Sec. 102(b) as being anticipated by Vowles et al (US 5,405,250).

Vowles et al discloses a wave energy extraction device including a wave follower having an opening at its bottom, as can be seen in Fig.1. As described in Vowles et al, column 1, lines 39-44, the invention comprises a:

"wave follower comprising; a buoyant upper body portion for tracking the rise of said waves, a lower body portion incorporating, at least one fluid fillable chamber, said chamber being enclosed on the top and sides, and with a mouth opening on the bottom of said chamber."

In addition, Vowles uses funneling panels to direct and augment the wave effect, as described in column 3, lines 16-18:

"The waves are funneled toward the wave follower 1 by means of vertical panels 4 and inclined panel 32." These panels can be clearly seen in Fig. 1.

By contrast, the present invention discloses a collection apparatus whose opening is oriented laterally and not downward, as in the Vowles device. In addition, the present invention does not require additional and bulky funneling, and consequently, does not employ the panel elements disclosed in the Vowles device.

The present invention is described in the specification on page 5, lines 24-26:

"Collection apparatus 17 is formed as a cavity 19 having an opening 21 positioned so as to face the direction of advancement of oncoming waves, indicated by arrow 23."

As can be easily seen, the elements utilized by each invention, to guide and harness the wave energy are clearly different, as are the invention geometries, and the conceptual design strategies involved.

As conceded by the Examiner, on page 5 of the Office Action:

"Vowles et al, fail to disclose the piping system having a pressure tank and a piping system connecting a hydraulic fluid from the piston apparatus to the pressure tank and further connecting the pressure tank to the hydraulic motor."

Therefore, Vowles does not anticipate the present invention under Sec. 102(b).

As stated in the decision in In Re Marshall, 198 USPQ 344 (1978), "To constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art...". Since the above reference neither 1) identically describes the invention, nor 2) enables one skilled in the art to practice it, Applicant deems the

102(b) rejection improper, and respectfully requests that it be withdrawn.

The Examiner has rejected claims 6 and 8-12 under Sec. 103(a) as being unpatentable over Vowles et al in view of Buonome.

As mentioned above, the Examiner has conceded that "Vowles et al, fail to disclose the piping system having a pressure tank and a piping system connecting a hydraulic fluid from the piston apparatus to the pressure tank and further connecting the pressure tank to the hydraulic motor."

The Examiner, on page 5 of the Office Action, states that:

"Buonome discloses in Figure 1 the piping system 15,22 having a pressure tank 17 and the piping system connecting the hydraulic fluid from the piston apparatus 14 to the pressure tank and further connecting the pressure tank to the hydraulic motor 24, a fluid reserve tank 21, one-way valves 16, 20, a pressure relief valve 18, and gas maintained at a high pressure,..."

However, apparently the Examiner did not appreciate the intrinsic and superior design of the present invention, as expressed in the fact that the present invention by definition pumps twice as much hydraulic fluid per unit time as the invention disclosed by Buonome.

Referring to Buonome, column 2, lines 57-58:

"A float is attached through a series of shafts to a piston."

Further referring to Buonome, column 3, lines 28-33:

"The piston rod is connected to the piston in the long horizontally mounted hydraulic cylinder 14. This connecting means converts a vertical up and down action

of the float produced by the water motion to a horizontal in and out movement..."

It is clear, looking at Fig. 1, that piston rod 12 only leads hydraulic fluid into the accumulator tanks 17 during half the float rise and fall cycle, i.e. when the float 3 descends.

As specifically stated in the specification of the present invention, page 8, lines 18-23:

"In accordance with a preferred embodiment of the invention, piping system 57 comprise a first conduit 61 for leading hydraulic fluid into pressure tank 59 when piston means 49 is contracted, and a second conduit 63 for leading hydraulic fluid into pressure tank 59 when piston means 49 is extended.", and as can be seen in the diagram of the present invention, the present invention discloses a pumping action capability during both contraction and expansion of the piston.

By contrast, the invention disclosed by Buonome, includes a piping system that provides pumping action during only a limited portion of the float rise and fall cycle.

It is the Applicant's position that the disclosure of a piping system as disclosed by Buonome, in which pumping is achieved in only a portion of the cycle, even if combined with Vowles' system could not have led to the development of the present invention, in which pumping is achieved both at piston contraction (float fall) and expansion (float rise).

As amended, claims 1 and 5 recite the feature of "pumping action capability during both contraction and expansion of the piston."

In citing the references under Sec. 103(a), the question is raised whether the references would suggest

the invention, as stated in the decision of In Re Lintner (172 USPQ 560, 562, CCPA 1972);

"In determining the propriety of the Patent Office case for obviousness in the first instance, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination or other modification."

Similarly, In Re Regel (188 USPQ 136, CCPA 1975) decided that the question raised under Sec. 103 is whether the prior art taken as a whole would suggest the claimed invention to one of ordinary skill in the art. Accordingly, even if all the elements of a claim are disclosed in various prior art references, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art why one of ordinary skill would have been prompted to combine the teachings of the references to arrive at the claimed invention.


Simply put, and as stated in In Re Clinton (188 USPQ 365 CCPA 1976), "do the references themselves... suggest doing what appellants have done", such that there is a requirement that the prior art must have made any proposed modification or changes in the prior art obvious to do, rather than obvious to try.

It is respectfully put forward by the Applicant that there is no reason to consider the prior art references, Vowles et al and Buonome, either individually or in combination, as rendering the invention obvious, since there is no prior art teaching supporting pumping action during the full float rise and fall cycle, as provided by the piping system of the present invention.

In view of the foregoing remarks, all of the claims in the application are deemed to be allowable. Further

reconsideration and allowance of the application is respectfully requested at an early date.

Respectfully submitted,

  
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## MARKED UP VERSION OF THE AMENDMENTS

In the specification:

The specification has been amended on page 2, paragraph 7, line 26, as follows:

(d) at least one piston apparatus for compressing and drawing hydraulic fluid when the piston apparatus is contracted or extended, correspondingly, the piston apparatus being hinged at one end to a stationary support, and hinged at ~~its other~~ another end in association with ~~a predetermined element~~ the coupling apparatus, operative to move in response to movement of the buoyancy apparatus;

The specification has been amended on page 3, paragraph 1, line 1, as follows:

(f) a piping system coupling the hydraulic fluid in the piston apparatus to the hydraulic motor, wherein the hydraulic fluid is transported via pumping action through the piping system to operate the hydraulic motor, the pumping action taking place during both contraction and expansion of the piston apparatus.

The specification has been amended on page 4, paragraph 3, line 7, as follows:

(d) at least one piston apparatus for compressing and drawing hydraulic fluid when the piston apparatus is contracted or extended, correspondingly, the piston apparatus being hinged at one end to a stationary support, and hinged at ~~its other~~ another end in association with ~~a predetermined element~~ the coupling apparatus, operative to move in response to movement of the buoyancy apparatus;



The specification has been amended on page 4, paragraph 5, line 13, as follows:

(f) a piping system coupling the hydraulic fluid in the piston apparatus to the hydraulic motor, wherein the hydraulic fluid is transported via pumping action through the piping system to operate the hydraulic motor, the pumping action taking place during both contraction and expansion of the piston apparatus.

In the claims:

Claim 1 has been amended, as follows:

1. A system for conversion of wave energy in a body of water having a floor, including:

(a) a stationary support element rigidly mounted to the floor of the body of water;

(b) a buoyancy apparatus including a buoy portion having formed therewith a wave energy collection apparatus in the form of a cavity integrally formed therewith, ~~the~~ said cavity having an opening facing the direction of advancement of oncoming waves;

(c) a coupling apparatus for hingedly connecting said buoyancy apparatus to said stationary support element so as to be pivotal in a generally vertical plane with respect to said stationary support element;

(d) at least one piston apparatus for compressing and drawing a hydraulic fluid when said piston apparatus is contracted or extended, correspondingly, said piston apparatus being hinged at one end to a said stationary support, and hinged at ~~its other~~ another end in association with ~~a predetermined element~~ said coupling apparatus, operative to move in response to movement of said buoyancy apparatus;

(e) a hydraulic motor having an energy output; and

(f) a piping system coupling said hydraulic fluid in said piston apparatus to said hydraulic motor, wherein said hydraulic fluid is transported via pumping action through said piping system to operate said hydraulic motor, said pumping action taking place during both contraction and expansion of said piston apparatus.

Claim 5 has been amended, as follows:

5. A system for conversion of wave energy in a body of water having a floor, including:

(a) a stationary support element rigidly mounted to the floor of the body of water;

(b) a buoyancy apparatus including a buoy portion having formed therewith a wave energy collection apparatus in the form of a cavity integrally formed therewith, the said cavity having an opening facing the direction of advancement of oncoming waves;

(c) a coupling apparatus for hingedly connecting said buoyancy apparatus to said stationary support element wherein said buoyancy apparatus is pivotal in a vertical plane with respect to a predetermined axis in said stationary support element, said coupling apparatus includes at least two parallel support arms, each of which is hinged to said stationary element and to said buoyancy apparatus, wherein each of said support ~~arm~~ arms is pivotal in a vertical plane about said stationary support element and said buoyancy apparatus, wherein corresponding portions of each of said support ~~arm~~ arms between its hinges are of an equal length, and wherein said buoyancy apparatus is free to move along at least a portion of a circular path described with respect to said stationary support element, in a said generally vertical plane, while said

buoy portion is retained above said collection apparatus,

and wherein at least one of said support arms includes a counterbalancing weight extending outwardly from said central predetermined axis toward the side opposed to away from said buoyancy apparatus;

(d) at least one piston apparatus for compressing and drawing a hydraulic fluid when said piston apparatus is contracted or extended, correspondingly, said piston apparatus being hinged at one end to a said stationary support, and hinged at its other another end in association with a predetermined element said coupling apparatus, operative to move in response to movement of said buoyancy apparatus;

(e) a hydraulic motor having an energy output; and

(f) a piping system coupling said hydraulic fluid in said piston apparatus to said hydraulic motor, wherein said hydraulic fluid is transported via pumping action through said piping system to operate said hydraulic motor, said pumping action taking place during both contraction and expansion of said piston apparatus.

In the Abstract:

The Abstract has been amended, by deleting the entire Abstract and replacing it with the following:

A system for wave energy conversion in a body of water. The system includes a stationary support element rigidly mounted to the water body floor, and a wave energy collection apparatus provided as a buoyant apparatus having a cavity whose opening faces the direction of advancement of oncoming waves. The buoyant apparatus is hingedly coupled to the stationary support

element, so as to be pivotal in a generally vertical plane with respect to the stationary support element. At least one piston apparatus for compressing and drawing hydraulic fluid is hingedly connected at one end to the stationary support, and its other end is hinged to the buoyant apparatus so as to move in response to its movement. A hydraulic motor is coupled to the piston apparatus via a piping system, for transporting the hydraulic fluid via pumping action, to operate the hydraulic motor, during both contraction and expansion of the piston apparatus.